Does Labor Diversity Promote Entrepreneurship?*

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Abstract

We find evidence that workforce educational diversity promotes entrepreneurial behavior of employees as well as the formation of new firms, whereas diversity in demographics hinders transitions to self-employment. Ethnic diversity favors entrepreneurship in financial and business services.

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1 Introduction

Despite a proliferating literature documenting a variety of aspects of how labor diversity may affect economic outcomes (Alesina and La Ferrara, 2005; Hong and Page, 2001; Lazear, 1999), the relationship between entrepreneurial activities and exposure to heterogeneous workforces is substantially left unexplored. To the best of our knowledge, Audretsch et al. (2010) is the only study analyzing this link at regional level and focusing mainly on the ethnic dimension.

Our aim is to fill such a gap. This study is inspired by the knowledge spillover theory of entrepreneurship (Audretsch and Keilbach, 2007) and the Jack-of-All-Trades theory (Lazear, 2004). The former suggests that the entrepreneurial activity tends to be greater in contexts where investments in knowledge and human capital are high or there is a relatively large amount of under-exploited knowledge useful for commercialization of new ideas. The latter concludes that the accumulation of a balanced skill-mix across different fields of expertise stimulates entrepreneurship as entrepreneurs must be sufficiently well versed in a variety of fields to manage different people and tasks.

Combining the conclusions of both theories, we assess whether a diversified workforce facilitates mechanisms of knowledge transfer (and sharing) that may ultimately stimulate entrepreneurial behavior of employees. The interaction with individuals presenting heterogeneous cultural backgrounds, skills, perspectives and attitudes to problem solving may promote the entrepreneurial behavior of employees, by favoring the accumulation of a balanced skill-mix across different competencies. However, workforce heterogeneity may also hinder these knowledge transfers by creating communication barriers (Lazear, 1999), reducing cooperative behavior and preventing reciprocal learning process.

Specifically, we evaluate whether and to what extent the level of diversity characterizing the workforce cultural background, education and demographics stimulates an employee to move to a self-employment status and eventually to establish a new firm. This latter aspect of the entrepreneurial behavior has received attention from scholars as new born firms typically outperform older and larger companies in terms of employment formation and innovative potential (Audretsch et. al, 2004).

The structure of the remainder of this paper is as follows: data, estimation strategy, results and conclusions.

2 Data

We retrieve demographic information on each employee from the Danish "Integrated Database for Labor Market Research" for the period 1980-2002. Merging this information with data on patent applications ascribed

to Danish firms at the European Patent Office and a detailed firm-level database (Generel Firmastatistik), we can distinguish patenting and exporting firms respectively for the period 1996-2002. We use data on patent applications to control for the departure firm innovativeness and to build up an external knowledge indicator based on geographical distance between firms.[1] This indicator accounts for closeness to industrial clusters or to innovative firms that might encourage entrepreneurial activities and lower the fixed costs associated with the start of a new business.

We analyze potential transitions to self-employment only for Danish employees in order to work on a more homogeneous sample and to exclude a potential bias due to forms of segregation eventually experienced by immigrants, as self-employment may represent a strategy to escape discrimination in the labor market. We construct a sample of individuals at risk of entering self-employment between 1996 and 2002 by drawing a random sample of employees that never move to self-employment, and combining it with a sample containing all first transitions to self-employment.[2] Thus, the final sample consists of 2.5 million individuals and 23 thousands departure firms over 7 years. Transitions to self-emploment cover about 1.2% of the full sample, whereas just a 0.22% is associated with the formation of new firms. Descriptive statistics in Table 1 show that transitions to self-employment are more likely to come from more ethnically and educationally (less demographically) diversi?ed workforce, providing a prima facie evidence of the phenomenon under analysis.

3 Estimation strategy

To investigate the effect of labor diversity on individual's propensity to become self-employed, we implement a standard linear probability model:

$$y_{it} = \gamma_c Div\_c_{it} + \gamma_s Div\_s_{it} + \gamma_d Div\_d_{it} + x_{it}^{'}\beta + v_{it}$$

y_{it} indicates whether employee i becomes self-employed at time t; the first three terms at the right-hand side are diversity in cultural background, education and demographics, respectively. Our diversity measures are computed at the firm level and based on the Herfindahl index. Diversity in cultural background is computed by using the main language spoken in employees' country of origin.[3] The education-related diversity is based on by the employees' highest achieved educational level while demographic diversity is represented by their age and gender.[4] The vector $x_{it}^{'}$ includes an extensive set of departure firm (firm size; dummies for 3-digit industry, foreign ownership, multi establishment, patenting and exporting activity; shares of

[1] The detailed construction of the this indicator is described in Parrotta et al. (2010).
[2] We make sure that a transition is not preceded by another one since 1980.
[3] We would like to thank Mariola Pytlikova for the provision of the linguistic classification used in this paper.
[4] The detailed construction of the indexes is described in Parrotta et al. (2010).

males, managers, middle-managers, highly educated workers, differently aged and foreign employees; the cited knowledge spillover indicator) and individual characteristics (work experience, departure firm tenure, dummies for gender, education, job position at the departure firm, being a parent, and having a parent with entrepreneurial experience).

As employees may self-select among workplaces with different degrees of labor diversity to improve their entrepreneurial chances, we implement an instrumental variable (IV) strategy à la Card (2001). Specifically, this IV strategy is based on the historical levels[5] of workforce diversity in ethnic, education and demographic characteristics at the commuting area where the firm is located.[6] The commuting area level presents a suitable supply driven instrument for workplace level diversity because commuting areas in Denmark (except for the area around Copenhagen) are relatively small and therefore firms very likely recruit workers from a given local supply of labor, which is characterized by a certain degree of heterogeneity. This argument is further reinforced by the role of networks in the employment process (Munshi, 2003) and rather low residential mobility in Denmark (Deding et al. 2009).

Finally, using only the sample of individuals moving to self-employment we implement the same linear probability model and identification strategy to evaluate to what extent labor diversity is associated with firm formation.

4 Results

Table 2 reports our main results. It emerges that the educational diversity favors transitions from employment to self-employment, whereas diversity in demographics hinders such transitions. Both OLS and IV show qualitatively similar effects.[7] Looking at the IV with all controls, we find that a standard deviation increase in the educational (demographic) diversity leads to a 0.07 (0.20) standard deviation increase (decrease) in an individual's propensity to become self-employed. The parameter on the ethnic diversity is positive but insignificant in our favorite specification.

Given the transition to self-employment, we find that the probability to establish a new firm is positively associated with the educational diversity but negatively with the demographic one. Specifically, a standard deviation increase in the educational (demographic) diversity is now associated with 0.15 (0.14) standard deviation increase (decrease) in a self-employed propensity to start a new business.

Robustness checks, related to transitions to self-employment, are reported in Table 3. These findings confirm the role of educational and demographic diversity, which are not affected significantly by the exclusion of

[5]The prediction of a commuting area diversity is computed by using its early 90s demographic composition and the current population stocks.

[6]In total 104 commuting areas are identified (Andersen A. K., 2000).

[7]The values of F-test always reject the hypothesis that our instruments are weak.

the only real agglomeration area in Denmark (Copenhagen county), elderly population (individuals born before 1950 might have experienced a transition before 1980, the first observed year) , big (multi-establishment) companies that typically attract talented workers. Interestingly, we find that ethnic heterogeneity promotes entrepreneurship in key industries like financial and business services.

5 Conclusions

We find evidence that both diversity in cultural backgrounds and education favors transitions from employment to self-employment. Conversely, these transitions are lowered by higher degrees of demographic heterogeneity. Further, given the self-employment status, educational diversity seems to foster firm formation.

Our findings support the hypothesis that exposure to higher degrees of cultural and educational heterogeneity facilitates knowledge transfer (and sharing), favoring the exploitation of new ideas. Age and gender differences seem instead to be associated with communication barriers, hindering then the transfer of valuable knowledge among employees.

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Table 1: Descriptive statistics

Sample	*Full*		*Self-employed*		*New Born*	
	Mean	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Individual's characteristcs						
Age16-26	0.2730931	0.4455484	0.2567242	0.4368337	0.1855144	0.388751
Age27-34	0.1956811	0.3967242	0.2815331	0.4497548	0.3445537	0.4752675
Age35-43	0.1755348	0.380424	0.2137953	0.4099912	0.2566188	0.4368085
Age44-52	0.1787528	0.3831452	0.1422707	0.3493337	0.1510968	0.3581771
Age $>$ 52	0.1769382	0.3816165	0.1056767	0.3074288	0.0622163	0.2415709
Women	0.497954	0.4999959	0.275446	0.4467466	0.324697	0.468306
Married or cohabiting	0.6268115	0.4836517	0.6671503	0.4712416	0.7229576	0.4475799
With at least one child	0.332639	0.4711585	0.3622947	0.4806719	0.4445915	0.4969674
Primary education	0.3180682	0.4657262	0.2291903	0.4203193	0.2225794	0.4160175
Secondary education	0.1086374	0.3111838	0.1428369	0.3499127	0.0798033	0.2710141
Vocational education	0.5109425	0.4998803	0.5226501	0.4994956	0.612708	0.4871774
Tertiary education	0.0623519	0.2417937	0.1053228	0.3069743	0.0849092	0.2787729
Work experience	14.21408	10.45411	12.30332	9.58963	12.40978	8.632139
Firm tenure at the departure firm	8.290387	6.069861	5.860416	4.526266	5.612652	4.192934
Middle manager or professional in the departure firm	0.6228584	0.4846709	0.5768101	0.4964587	0.553152	0.497210
Manager in the departure firm	0.0234421	0.1513029	0.0356724	0.1891361	0.032681	0.177821
Father self-employed	0.0296277	0.169558	0.0406285	0.1974316	0.0518154	0.2216752
Mother self-employed	0.0185404	0.1348951	0.027534	0.1636362	0.0355522	0.1851883
Father with at least secondary education	0.0296277	0.169558	0.0406285	0.1974316	0.0518154	0.2216752
Mother with at least secondary education	0.0185404	0.1348951	0.027534	0.1636362	0.0355522	0.1851883
Geo_spillover	115.2895	149.9405	133.1394	160.9683	120.8501	152.6512
Departure firm's characteristics						
Ethnic diversity disaggr	0.4065773	0.3029414	0.4268899	0.323234	0.4351525	0.3232351
Educational diversity disaggr	0.7032606	0.1214937	0.7985207	0.1624794	0.7868781	0.1682267
Demographic diversity disaggr	0.8932451	0.0850529	0.8685556	0.1519109	0.8610978	0.1640983
Share of males	0.5146304	0.2523036	0.5743982	0.2579479	0.5750639	0.267753
Share of managers	0.0233648	0.0327334	0.0252905	0.0418358	0.0242355	0.0391058
Share of middle-managers	0.593668	0.2216753	0.6091905	0.2416847	0.6426358	0.2370811
Share of workers with secondary and vocational education	0.6195799	0.4854902	0.665487	0.4718283	0.6925113	0.4614972
Share of workers with tertiary education	0.0623519	0.2417937	0.1053228	0.3069743	0.0849092	0.2787729
Share of foreigners	0.0428802	0.0508932	0.0467643	0.0621035	0.0454386	0.064624
Share of employees (16-30)	0.2284586	0.1986013	0.2412687	0.2044661	0.2486717	0.20804
Share of employees (31-40)	0.1949014	0.0823051	0.2140624	0.1132589	0.2163508	0.1250877
Share of employees (41-52)	0.2114552	0.081881	0.2082332	0.1037147	0.2087215	0.1110213
Share of employees ($>$ 52)	0.1949014	0.0823051	0.2560624	0.1132589	0.2163508	0.1250877
Patenting firm	0.0436235	0.2042559	0.0358154	0.1858329	0.0313918	0.1743908
Exporting firm	0.3018032	0.4590404	0.3002548	0.4583768	0.2766641	0.4473913
Foreign ownership	0.0024619	0.0495568	0.0027959	0.0528029	0.0024584	0.0495259
Log of firm size (number of employees)	6.423577	2.518312	5.912163	2.55664	5.481491	2.483237
Multi-establishment	0.6488841	0.4773192	0.5492639	0.497576	0.4854387	0.4998352
Departure firms	23014					
Arrival firms			17031		5031	
Observations	2568710		31250		5691	

Notes: All variables are expressed as averages from 1996 to 2002.

Table 2: The effects of labor diversity on the transition to entrepreneurship.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	IV	IV	IV	OLS	IV
Firm ethnic diversity	0.00174***	0.00072**	0.00063***	0.01520***	0.01348**	0.01131	0.00961	0.01227
	(0.00026)	(0.00026)	(0.00025)	(0.00730)	(0.00721)	(0.00792)	(0.00300)	(0.00891)
Firm educational diversity	0.01422***	0.00697***	0.00641***	0.10012***	0.09412***	0.07036***	0.01064**	0.15732**
	(0.00069)	(0.00070)	(0.00075)	(0.00336)	(0.00364)	(0.00885)	(0.00454)	(0.07956)
Firm demographic diversity	-0.04779***	-0.04987***	-0.04381***	-0.27508***	-0.25733***	-0.20130***	-0.01097**	-0.14312*
	(0.00094)	(0.00098)	(0.00122)	(0.01648)	(0.02155)	(0.02364)	(0.00560)	(0.07319)
Exporting firm		0.00285***	0.00282***		0.00282***	0.00267***	-0.00317	-0.00364
		(0.00050)	(0.00050)		(0.00050)	(0.00051)	(0.00429)	(0.00443)
Patenting firm		0.00306***	0.00302***		0.00358***	0.00331***	0.00373	0.00309
		(0.00060)	(0.00060)		(0.00061)	(0.00061)	(0.00494)	(0.00510)
Father self-employed			0.00051**			0.00390***	0.00483**	0.00461**
			(0.00020)			(0.00028)	(0.00171)	(0.00198)
Mother self-employed			0.00100**			0.00159**	0.01041**	0.00213
			(0.00035)			(0.00048)	(0.00353)	(0.00473)
Geo_spillover			0.00001***			0.00001***	0.00001	0.00001
			(0.00000)			(0.00000)	(0.00001)	(0.00001)
F-stat on excluded instruments				845.22; 638.51; 595.47	426.80; 329.39; 307.50	652.67; 476.61; 442.26		909.18; 866.56; 943.73
Industry, county and year dummies	yes	yes	yes	yes	yes	yes	yes	yes
Other individual's characteristics	no	yes	yes	no	yes	yes	yes	yes
Other departure firm's characteristics	yes	yes	yes	yes	yes	yes	yes	yes
Other parents' characteristics	no	no	yes	no	no	yes	yes	yes
Observations	2553005	2536983	2536983	2553005	2536983	2536983	30534	30534
R2	0.005	0.011	0.012	0.005	0.012	0.012	0.042	0.030

Notes: In Columns 1-6, the dependent variable is the probability to become self-employed. In Columns 7 and 8, the dependent variable is the probability to form a new firm conditional on self-employment. Beta coefficients are reported. Significance levels: ***1%, **5%, *10%.

Table 3: The effects of labor diversity on the transition to self-employment, robustness checks.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Estimates by Industry							**"Copenhagen" county is excluded**	**Born before 1950 excluded**	**Mono-establishment firms**
	Manufacturing	Construction	Ws and retail trade	Transport	Financial and business activities	Public and personal services	Other			
Index Ethnic Disaggr	0.03212	-0.05358	0.00413	0.00332	0.04665***	0.01125	-0.02363	0.01158	0.01163	0.11267
	(0.01730)	(0.03365)	(0.01144)	(0.03860)	(0.00541)	(0.05347)	(0.01527)	(0.00736)	(0.00658)	(0.06412)
Index Edu Disaggr	0.10580**	0.21129	0.06449	0.07047*	0.04280**	0.05348***	0.07714**	0.08116***	0.06140***	0.03611***
	(0.03477)	(0.51608)	(0.02209)	(0.03978)	(0.01773)	(0.00794)	(0.03632)	(0.01071)	(0.00999)	(0.01338)
Index Demo Disaggr	-0.28131***	-0.25555***	-0.30812***	0.01624	-0.25943**	-0.20023***	-0.27489***	-0.22069***	-0.21861***	-0.23560***
	(0.08439)	(0.07767)	(0.01936)	(0.08239)	(0.12079)	(0.03576)	(0.01976)	(0.03911)	(0.04556)	(0.01800)
Observations	396159	122230	563044	59081	270514	2401824	277328	2270925	1944049	894776
R2	0.006	0.004	0.005	0.013	0.004	0.007	0.004	0.012	0.012	0.013

Notes: The dependent variable is the probability to become self-employed. Beta coefficients are reported. Significance levels: ***1%, **5%, *10%.